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10/528,794	03/23/2005	Osamu Ishigami	SHM-I5962	9163

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EXAMINER	
ROE, JESSEE RANDALL	

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1793	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/528,794	ISHIGAMI ET AL.	
	Examiner	Art Unit	
	Jessee Roe	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 January 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-7 and 9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 4-7 and 9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6 January 2010*.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6 January 2010 has been entered.

Status of the Claims

Claims 1, 4-7 and 9 are pending wherein claim 1 is amended and claims 2-3 and 8 are canceled.

Claim Rejections - 35 USC § 112

Claims 1 and 4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to the recitation "added with a pH buffer, or provided with a pH buffer action" in lines 6-7 of claim 1, it is unclear how the pH buffer could perform an action without being added to the alkaline solution. Thus, the scope of the claim is indefinite.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Soyama et al. (JP 2002-012990) in view of Kovacs et al. (US 5,211,663).

In regards to claim 1, Soyama et al. (JP'990) teaches a passivation method for treating a metal workpiece to improve corrosion resistance, wherein the metal workpiece is immersed in an alkaline passivation solution comprising an alkaline agent such as sodium bicarbonate, calcium carbonate, and carbon dioxide (abstract, paragraph [0021]). Air bubbles are generated by a water jet or an ultrasonic wave in the alkaline passivation solution and the pH of the passivation solution is controlled (abstract, paragraphs [0006-0012]). Soyama et al. (JP'990) further teaches such passivation method can be applied to metals such as stainless steel (abstract, paragraph [0014]).

Soyama et al. (JP'990) discloses a passivation method for treating a metal workpiece to improve corrosion resistance as set forth above, but Soyama et al. (JP '990) does not specify that the air bubbles are from external air or the claimed treatment temperature of 40-60°C.

Kovacs et al. ('663) discloses a passivation method for treating metal surfaces such as stainless steel (abstract). Kovacs et al. ('663) further teaches that the passivation solution may be oxygenated by bubbling with air or oxygen to improve the

passivation process (col. 5 lines 52-54). Kovacs et al. ('663) also teaches that the passivation temperature is 20-50°C and higher passivation temperature leads to faster passivation rate, but could also result in a less uniform passive layer (col. 5 lines 55-62).

It would have been obvious to one of ordinary skill in the art to have substituted the cavitation air bubble generation technique as taught by Soyama et al. (JP'990) with air or oxygen bubbling technique as taught by Kovacs et al. ('663) with expected success of improving the passivation process as taught by Kovacs et al. ('663).

In addition, one of ordinary skill in the art would have found it obvious to have varied the passivation temperature in the passivation method of Soyama et al. (JP'990) via routine optimization to achieve desired passivation rate and the desired uniform passive layer on the metal surface, since Kovacs et al. ('663) teaches that the passivation temperature is a result effective variable that affects the rate of passivation and the uniformity of the passive layer.

In addition, the alkaline passivation solution as taught by Soyama et al. (JP'990) in view of Kovacs et al. ('663) has a pH that encompasses the claimed pH of 9-12. Therefore, a prima facie case of obviousness exists. See MPEP 2144.05 I. The selection of claimed pH range from the disclosed range of Soyama et al. (JP'990) in view of Kovacs et al. ('663) would have been obvious to one skilled in the art since Soyama et al. (JP'990) in view of Kovacs et al. ('663) teach the same utilities throughout the disclosed pH range.

Furthermore, since Soyama et al. (JP'990) teaches that the pH of its passivation solution is controlled, then the claimed addition of a pH buffer or the claimed pH buffer

action is present within the passivation process of Soyama et al. (JP'990) in view of Kovacs et al. ('663).

Lastly, Soyama et al. (JP'990) in view of Kovacs et al. ('663) teach the claimed alkaline solution containing the claimed carbon dioxides, the examiner concludes that the claimed passive film produced from metal ions constituting stainless steel and hydroxide ions is formed in the process of Soyama et al. (JP'990) in view of Kovacs et al. ('663).

With respect to the amended feature "after immersing the stainless steel member, the member is then dried by being held at 100 to 200°C" in lines 12-13 of claim 1, Kovacs et al. ('663) further teaches that after the formation of passive film, the metal surface is rinsed with water and dried (col. 6 lines 11-13). Therefore, one of ordinary skill in the art would have found it obvious to have rinsed the stainless steel surface undergone the passivation process of Soyama et al. (JP'990) in view of Kovacs et al. ('663) with water and dried the passive film as taught by Kovacs et al. ('663) in order to remove excess passivation solution on the metal surface and to dry the passive film. In addition, even though Soyama et al. (JP'990) in view of Kovacs et al. ('663) do not specify the claimed drying temperature of 100-200°C, one of ordinary skill in the art would have found it obvious to have varied the drying temperature in the process of Soyama et al. (JP'990) in view of Kovacs et al. ('663) via routine optimization in order to achieve desired coating drying speed since the drying temperature directly affects how fast the passive layer becomes dry. MPEP 2144.05 II.

In regards to claim 4, even though Soyama et al. (JP'990) in view of Kovacs et al. ('663) do not explicitly teach that the stainless steel member is a separator for fuel cell,

one of ordinary skill in the art would have found it obvious to apply the metal surface treatment process of Soyama et al. (JP'990) in view of Kovacs et al. ('663) to a stainless steel member used for any purposes including the claimed separator in a fuel cell.

Claims 5-7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohtani et al. (US 2003/0162077) in view of Fukui et al. (US 6,440,598), and further in view of Kovacs et al. (US 5,211,663) and McCready (US 4,382,825).

In regards to claim 5, Ohtani et al. ('077) teaches a method for making stainless steel separator for use in a fuel cell comprising pressing the stainless steel sheet to form gas flow and cooling water passages and subjecting the press-formed separator to passivation treatment to form a passivation layer on the surface of the stainless steel separator(abstract, paragraphs [0005, 0009, 0024]).

However, Ohtani et al. ('077) does not specify the claimed application of lubricant and the claimed cleaning, rinsing, passivation using an alkaline solution and drying steps.

Fukui et al. ('598) teaches also teaches a process for the manufacturing of separators for use in a fuel cell (abstract). Fukui et al. ('598) further teaches that the workability of the metal material during press-forming can be improved by applying a lubricant onto the surface of the material (col. 2 lines 27-63).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the use of a lubricant as taught by Fukui et al. ('598), into the separator manufacturing process of Ohtani et al. ('077) in order to improve the workability of the press-forming step as taught by Fukui et al. ('598) (col. 2 lines 27-63).

Kovacs et al. ('663) discloses a passivation method for treating metal surfaces such as stainless steel (abstract). Kovacs et al. ('663) further teaches that the passivation solution may be oxygenated by bubbling with air or oxygen to improve the passivation process (col. 5 lines 52-54). Kovacs et al. ('663) also teaches that the passivation temperature is 20-50°C and higher passivation temperature leads to faster passivation rate, but could also result in a less uniform passive layer (col. 5 lines 55-62). Kovacs et al. ('663) further teaches that its passivation process can be preceded by pre-treatments such as alkaline cleaning and rinsing steps (col. 5 lines 25-30). Furthermore, Kovacs et al. ('663) teaches that the passivated and heat treated metal surface can be rinsed and dried (col. 6 lines 12-14). The passivation film formed as taught by Kovacs et al. ('663) comprises hydroxide as claimed (col. 6, lines 3-5). Example 4 of Kovacs et al. ('663) further shows that an alkaline pH of 12 (col. 7, line 32).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the passivation process, including the pre-treatment and post-treatment steps, as taught by Kovacs et al. ('663) into the passivation step in the separator manufacturing process of Ohtani et al. ('077) in view of Fukui et al. ('598), in order to achieve superior corrosion resistance as taught by Kovacs et al. ('663) (col. 3 lines 59-62).

McCready ('825) teaches an alkaline cleaning process comprising treating a steel surface with an alkaline cleaning solution to remove surface contaminates such as lubricant to prepare the steel surface for subsequent coating treatment (col. 1, lines 33-65). McCready ('825) further teaches that it is conventional to rinse the cleaned metal

surface with tap water followed by deionized water to remove excess cleaning solution from the metal surface (col. 1, lines 33-65).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the alkaline cleaning step including the two rinsing steps as taught by McCready ('825) into the alkaline cleaning step of Ohtani et al. ('077) in view of Fukui et al. ('598) and Kovacs et al. ('663) in order to thoroughly remove the contaminates such as lubricant from the metal surface to prepare the steel surface for subsequent coating treatment, as taught by McCready ('825) (col. 1, lines 33-65).

Still regarding claim 5, the separator manufacturing process as taught by Ohtani et al. ('077) in view of Fukui et al. ('598), Kovacs et al. ('663) and McCready ('825) is substantially the same as the separator manufacturing process as claimed (i.e. substantially the same press-forming, alkaline cleaning, washing/rinsing, passivation, rinsing and thermal drying steps). In addition, even though Kovacs et al. ('663) teaches that the passivation solution is applied by immersion instead of spraying, one of ordinary skill in the art would have found it obvious that the passivation solution of Ohtani et al. ('077) in view of Fukui et al. ('598) and Kovacs et al. ('663) can be applied by spraying with expected success since both spraying and immersion are functionally equivalent passivation application techniques widely known, accepted and used in the metal surface passivation and conversion coating industry.

Furthermore, the first rinsing step with tap water after the application of an alkaline cleaning solution as taught by Ohtani et al. ('077) in view of Fukui et al. ('598), Kovacs et al. ('663) and McCready ('825) reads on the claimed washing water being mains water or industrial water. The second rinsing step with deionized water after the

first rinsing step as taught by Ohtani et al. ('077) in view of Fukui et al. ('598), Kovacs et al. ('663) and McCready ('825) read on the claimed washing water removing step.

With respect to the amended feature "after immersing the stainless steel member, the member is then dried by being held at 100 to 200°C" in lines 20-21 of claim 5, Kovacs et al. ('663) further teaches that after the formation of passive film, the metal surface is rinsed with water and dried (col. 6 lines 11-13). Therefore, one of ordinary skill in the art would have found it obvious to have rinsed the stainless steel surface undergone the passivation process of Soyama et al. (JP'990) in view of Kovacs et al. ('663) with water and dried the passive film as taught by Kovacs et al. ('663) in order to remove excess passivation solution on the metal surface and to dry the passive film. In addition, even though Soyama et al. (JP'990) in view of Kovacs et al. ('663) do not specify the claimed drying temperature of 100-200°C, one of ordinary skill in the art would have found it obvious to have varied the drying temperature in the process of Soyama et al. (JP'990) in view of Kovacs et al. ('663) via routine optimization in order to achieve desired coating drying speed since the drying temperature directly affects how fast the passive layer becomes dry. MPEP 2144.05 II.

In regards to claim 6, the passivation solution as taught by Ohtani et al. ('077) in view of Fukui et al. ('598), Kovacs et al. ('663) and McCready ('825) has a pH of 12 as shown in Example 6 of Kovacs et al. ('663). Kovacs et al. ('663) further teaches a preferred the passivation temperature of 37°C (col. 5, line 58).

In regards to claim 7, Kovacs et al. ('663) further teaches the addition of pH buffer (col. 5 lines 50-52).

In regards to claim 9, McCready ('825) further teaches that its alkaline cleaning solution comprises a basic salt and a surfactant (abstract and col. 2, line 14 – col. 3, line 9).

Claims 5-6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohtani et al. (US 2003/0162077) in view of Fukui et al. (US 6,440,598), and further in view of Teumac (US 3,413,160) and McCready (US 4,382,825).

In regards to claim 5, Ohtani et al. ('077) teaches a method for making stainless steel separator for use in a fuel cell comprising pressing the stainless steel sheet to form gas flow and cooling water passages and subjecting the press-formed separator to passivation treatment to form a passivation layer on the surface of the stainless steel separator(abstract, paragraphs [0005, 0009, 0024]).

However, Ohtani et al. ('077) does not specify the claimed application of lubricant and the claimed cleaning, rinsing, passivation using an alkaline solution and drying steps.

Fukui et al. ('598) teaches also teaches a process for the manufacturing of separators for use in a fuel cell (abstract). Fukui et al. ('598) further teaches that the workability of the metal material during press-forming can be improved by applying a lubricant onto the surface of the material (col. 2 lines 27-63).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the use of a lubricant as taught by Fukui et al. ('598), into the separator manufacturing process of Ohtani et al. ('077) in order to improve the workability of the press-forming step as taught by Fukui et al. ('598) (col. 2 lines 27-63).

Teumac ('160) discloses immersing a ferrous metal in a cleaning solution having a pH of about 7.5 to 10; bubbling air through the solution; an operating temperature range of less than about 195°F (91°C); and the presence of hydroxide (col. 2 and col. 5, lines 30-45). Teumac ('160) further discloses that this process would be conducted in order to provide a clean and bright metal surface (col. 1, lines 61-65).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the passivation process, as taught by Teumac ('160), into the passivation step in the separator manufacturing process of Ohtani et al. ('077) in view of Fukui et al. ('598), in order to provide a clean and bright metal surface, as disclosed by Teumac ('160) (col. 1, lines 61-65).

McCready ('825) teaches an alkaline cleaning process comprising treating a steel surface with an alkaline cleaning solution to remove surface contaminates such as lubricant to prepare the steel surface for subsequent coating treatment (col. 1, lines 33-65). McCready ('825) further teaches that it is conventional to rinse the cleaned metal surface with tap water followed by deionized water to remove excess cleaning solution from the metal surface (col. 1, lines 33-65).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the alkaline cleaning step including the two rinsing steps as taught by McCready ('825), into the alkaline cleaning step of Ohtani et al. ('077) in view of Fukui et al. ('598) and Teumac ('160), in order to thoroughly remove the contaminates such as lubricant from the metal surface to prepare the steel surface for subsequent coating treatment, as taught by McCready ('825) (col. 1, lines 33-65).

With respect to the amended feature “after immersing the stainless steel member, the member is then dried by being held at 100 to 200°C” in lines 20-21 of claim 5, Teumac discloses drying (col. 6, lines 67-73). One of ordinary skill in the art would have found it obvious to have varied the drying temperature in the process of Ohtani et al. (‘077) in view of Fukui et al. (‘598), and further in view of Teumac (‘160) and McCready (‘825) via routine optimization in order to achieve desired coating drying speed since the drying temperature directly affects how fast the passive layer becomes dry. MPEP 2144.05 II.

In regards to claim 6, Teumac (‘160) discloses immersing a ferrous metal in a cleaning solution having a pH of about 7.5 to 10; bubbling air through the solution; an operating temperature range of less than about 195°F (91°C); and the presence of hydroxide (col. 2 and col. 5, lines 30-45).

In regards to claim 9, McCready (‘825) further teaches that its alkaline cleaning solution comprises a basic salt and a surfactant (abstract and col. 2, line 14 – col. 3, line 9).

Response to Arguments

Applicant's arguments filed 6 January 2010 have been fully considered but they are not persuasive.

First, the Applicant primarily argues that the thermal drying process carried out at 100 to 200°C has an effect of drying the stainless steel by vaporizing washing water adhered to a passivated coating film on a surface of the stainless steel and also an effect of stabilizing the passivated coating film on the surface of the stainless steel and

thus improving the corrosion resistance of the stainless steel and these advantageous effects are evidenced by lower corrosion densities shown in Figure 3 of the present application and not shown or taught by any of the cited references.

In response, the Examiner notes that the Applicant has not distinguished the criticality of the drying temperature within the range of 100 to 200°C as Figure 3 is drawn to the temperature of the passivation and not the drying temperature (page 10, lines 6-9 of the specification). MPEP 716.02(b).

Second, the Applicant primarily argues that the bubbling technique shown in Soyama et al. (JP'990) relies on vapor bubbles produced by cavitation and impingement of the cavitation vapor bubbles on a surface of a treated object or work surface to increase an electric potential of the work surface to thereby form a passivated coating film on the work surface. The Applicant further argues that vapor bubbles produced by cavitation do not increase the amount of oxygen dissolved in the liquid, as required by claim 1 and the air bubbling shown in Kovacs ('663) is not conducted during a passivation treatment but done before the passivation treatment for adjusting a pH of a treatment solution and there is no motivation to substitute the cavitation vapor bubbling as taught by Soyama et al. (JP'990) with the air-bubbling as taught by Kovacs ('663).

In response, the Examiner notes that Kovacs ('663) teaches a process for passivating stainless steel wherein external air/oxygen bubbling can be utiized to improve passivation and one having ordinary skill in the art would have realized that both air bubbling by cavitation as taught by Soyama et al. (JP'990) and external

air/oxygen bubbling by Kovacs ('663) perform the same function of aiding or improving passivation film formation on stainless steel surfaces. Therefore, one of ordinary skill in the art would have found substitution of air bubbling by cavitation, as taught by Soyama et al. (JP'990) with external air/oxygen bubbling, as taught by Kovacs ('663) an expected success of improved passivation film formation. Additionally, the claims do not preclude the step of air bubbling before passivation since the claims utilize “comprising” transitional language.

Third, the Applicant primarily argues that none of the cited references describe the particular drying process now recited in claim 5 as amended.

In response, one having ordinary skill in the art would have it obvious to have varied the drying temperature in the process of Soyama et al. (JP'990) in view of Kovacs ('663) via routine optimization in order to achieve the desired coating drying speed since the drying temperature directly affects how fast the passive layer becomes dry. MPEP 2144.05 II.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571)272-5938. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax

phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
Supervisory Patent Examiner, Art Unit 1793

/JR/